

CLAIMS:

1. A temperature monitoring system configured for measuring temperature of a battery assembly, the temperature monitoring system comprising:

at least one optical temperature sensor configured for measuring the temperature of at least one portion of the battery assembly and generating a measured temperature signal representative thereof;

an optical cable coupled to the sensor and configured for transmitting the measured temperature signal; and

battery temperature monitoring circuitry coupled to the cable and, configured for monitoring the measured temperature signal from the at least one portion of the battery assembly.

2. The temperature monitoring system of claim 1, further comprising battery temperature control circuitry coupled to the battery temperature monitoring circuitry and configured to generate a control signal based upon the measured temperature signal.

3. The temperature monitoring system of claim 2, further comprising a battery charging device coupled to the battery temperature control circuitry and configured for charging the battery assembly based on the control signal.

4. The temperature monitoring system of claim 1, wherein the battery assembly comprises a plurality of battery modules, wherein each battery module further comprises a plurality of batteries, the battery temperature monitoring circuitry being configured to monitor temperature of at least two battery modules or the batteries.

5. The temperature monitoring system of claim 1, the optical temperature sensor comprising a Bragg grating structure etched onto an optical fiber.

6. The temperature monitoring system of claim 1, wherein the optical temperature sensor is disposed outside the battery assembly.

7. The temperature monitoring system of claim 1, wherein the optical temperature sensor is disposed inside the battery assembly.

8. The temperature monitoring system of claim 1, wherein the battery temperature monitoring circuitry comprises:

a laser modulation device configured for generating a laser trigger signal;
reference circuitry configured for generating a reference signal;
measurement circuitry configured for providing at least one measurement signal of at least the portion of the battery assembly; and
a plurality of fiber optic couplers configured for splitting the laser trigger signal, the fiber optic couplers coupling the laser modulation device to the reference circuitry and the measurement circuitry.

9. The temperature monitoring system of claim 8, wherein the measurement signal comprises a temperature measurement and a location indicator.

10. A method for monitoring temperature of a battery assembly, the method comprising:

optically measuring temperature of at least one portion of the battery assembly;
transmitting a signal representative of the measured temperature; and
monitoring the temperature signal.

11. The method of claim 10, further comprising controlling a charge in the battery assembly based on the measured temperature.

12. The method of claim 10, wherein the step of monitoring comprises generating a laser trigger signal and a reference signal;

generating a plurality of measurement signals based on the measured temperature;

generating a control signal based on the reference signal and the measurement signals; and

charging the battery assembly based on the control signal.

13. The method of claim 10, wherein the optical temperature measuring step comprises measuring an external temperature of the battery assembly.

14. The method of claim 10, wherein the optical temperature measuring step comprises measuring an internal temperature of the battery assembly.

15. An optical temperature monitoring and control system configured for measuring temperature of a battery assembly, the temperature monitoring system comprising:

an optical temperature sensor assembly comprising a plurality of sensors configured for measuring the temperature of at least one portion of the battery assembly; wherein the battery assembly comprises a plurality of battery modules, wherein each battery module further comprises a plurality of batteries;

an optical cable coupled to the sensor assembly configured for transmitting a signal representative of the measured temperature;

battery temperature monitoring circuitry coupled to the sensor assembly and configured for monitoring the measured temperature of the portion of the battery assembly; and

battery temperature control circuitry coupled to the battery temperature monitoring circuitry and configured for generating a control signal based on the measured temperature.

16. The optical temperature monitoring and control system of claim 15, further comprising a battery charging device coupled to the battery temperature control circuitry, configured for charging the battery assembly based on the control signal.

17. The optical temperature monitoring and control system of claim 15, wherein the optical temperature sensors comprise a Bragg grating etched onto the optical fiber.

18. The optical temperature monitoring and control system of claim 15, wherein the optical temperature sensors are disposed outside the battery assembly.

19. The optical temperature monitoring and control system of claim 15, wherein the optical temperature sensors are disposed inside the battery assembly.

20. A method for optically monitoring temperature and controlling the charging of a battery assembly, the method comprising:

optically measuring temperature of at least one portion of the battery assembly;
transmitting a signal representative of the measured temperature;
monitoring the temperature of the portion of the battery assembly via the signal;
and
controlling a charge in the battery assembly based on the measured temperature.

21. A system for monitoring temperature of a battery assembly, the system comprising:

means for optically measuring temperature of at least one portion of the battery assembly;
means for transmitting a signal representative of the measured temperature;
means for monitoring the temperature of the portion of the battery assembly via the signal; and
means for controlling a charge in the battery assembly based on the measured temperature.